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ORIGINAL ARTICLE

Parental Self-Medication with Antibiotics in Pakistan

ABDUL SALAM[1], SAMINA WASEEM[2], LAIBA AKHTAR[3], HAFIZ ABDUL MANAN[4], MUHAMMAD AWAIS BIN ABDUL MALIK[5], NOMAN SIDDIQUE[6]

[1]Final Year MBBS, Sheikh Zayed Medical College, Rahim Yar Khan.
[2]Associate Professor & Head Of Department Community Medicine, Sheikh Zayed Medical College Rahim Yar Khan
[3]Final Year MBBS, Sheikh Zayed Medical College, Rahim Yar Khan
[4]House officer, Bahawal Victoria Hospital Bahawalpur
[5,6]Final Year MBBS, Sheikh Zayed Medical College, Rahim Yar Khan
Correspondence to: Abdul Salam, Email: abdulsalam200007@gmail.com, Cell: 03347139154

ABSTRACT

Background: Antibiotic resistance due to irrational use of antibiotics is on an alarming level and self-medication is a key factor behind this. Self-medication refers to the use of medicines to treat self-diagnosed disease. Parent's knowledge and behavior is an important factor to reduce practice of self-medication. This study aims to evaluate prevalence of parental self-medication with antibiotics and knowledge, attitude and practices toward antibiotics use.

Methods: A cross-sectional descriptive statistical analysis was performed which targeted parents of children between ages 1-14 by self-administered questionnaire.

Results: Responses showed that 81.9% of participants had knowledge about antibiotics and among this percentage 21.8% did not visit physician and self-medicated their child in case of disease. Of those who had visited physician in case of disease, 50.8% refilled last prescription in case of recurrence of disease. Study showed there is a significant relationship between parent's education and physician visit. Only 15.2% of participants had good knowledge about antibiotics resistance.

Practical Implication: Adults in Pakistan have been documented as engaging in antibiotic self-medication. However, there is scant data on parents who medicate their kids at home. To the best of our knowledge, however, there has been no research done on the prevalence of self-medication among the people of Punjab.

Conclusion: Parent's awareness and health education are the main contributing factors in proper use of antibiotics and should be considered by health policy makers. Antibiotics stewardship programs must be tailored in favor of parent's awareness about antibiotics use.

Keywords: Self-medication, Antibiotics, Parents education, Children, Pakistan

INTRODUCTION

Self-medication is defined as the utilization of medicines to treat self-diagnosed diseases or symptoms.[1] World Health Organization defines self-medication as, "the selection and use of medicines to treat self-recognized illness or symptoms".[2] It can also be defined as the continuous use of prescribed medicine for recurrent diseases.[3] Self-medication involves the reuse of already prescribed old drugs, purchasing drugs from pharmacies without prescription, or using shared drugs. Self-medication also includes using medicines for a recurrent disease that was diagnosed by a doctor in past or using drugs for easily diagnosed diseases.[4] Responsible self-medication has advantages like easy availability, rapid treatment, but it comes with greater risks like lack of knowledge about the drug, its side effects, and drug interaction with other drugs resulting in serious consequences.[5] Specific misuse of self-medication with antibiotics is the emerging resistance.

The term "antibiotics" was first used by American microbiologist Selman Waksman and he described antibiotics as chemicals that were produced by microorganisms and had antagonistic effects against microorganisms.[6,7] The use of microorganisms to treat microbial infections was highly frequent in ancient Egypt, Greece, and china and this use of microorganisms is thoroughly documented. The modern era of antibiotics started with the discovery of the first antibiotic by Alexander Fleming in 1928.[4,7] He used fungus to make the first antibiotic which was then named penicillin. Since then antibiotics have changed medicine life altogether and have helped in saving millions of lives. Antibiotics target bacterial cells either by killing them or cessation of their growth. Based on the mechanism of action, antibiotics are classified into different types. At first, antibiotics were used only against serious infections. The use of Penicillin increased a lot during World War II.[7] It treated many bacterial infections and saved a lot of lives. However, with its increased use, came substantial penicillin resistance and its effectiveness decreased to a greater level. So by the end of 1950, most of the advances of the prior decade were at great risk.[8]

As a result, new antibiotics were developed, deployed, and used and so confidence in antibiotics was restored. However, the first case of resistant strain was discovered in the same decade and this process went on. Since then, resistance has played an important role in the treatment of bacterial infections and now resistance is developed in almost all antibiotics. According to a research held in the USA in 2001, it was stated that in 1980, 3-5% of streptococcal infections were resistant to penicillin and by 1998, 34% of streptococci sampled were found to be resistant.[9] According to research done in the United States, in 2019, one person die every 15 minutes due to microbial infection that is no longer treated effectively by antibiotics, 700,000 people die of drug resistance worldwide each year. This research stated if we don't take radical actions now this number can rise to 10 million by 2050 (10). "Stop referring to post antibiotics era - it's already here, states the CDC report "You and I are living in a time when some miracle drugs no longer perform miracles".[10] WHO has also warned about the post antibiotics era. "A post-antibiotic era – in which common infections and minor injuries can kill – for from being an apocalyptic fantasy, is instead a very real possibility for the twenty-first century," writes Keiji Fukuda, WHO assistant director general for health security, in a foreword to the report.[11] Antibiotic resistance develops naturally but it worsens by our actions. Bacteria develop resistance to antibiotics when these antibiotics are misused. Bacteria develop resistance by turning on resistance processes, changing themselves to protect against antibiotics, and by introducing resistant genes.[12]

The main contributor of bacterial resistance is the misuse of antibiotics which involves self-medication without a definitive diagnosis. Self-medication with antibiotics is now common in both developed and developing countries.[13] Antibiotics are one of the most purchased drugs in pharmacies and an estimation is made that about 50% of antibiotics are used worldwide without prescription.[14] Self-medication with antibiotics may lead to serious consequences for public health. Due to a lack of adequate knowledge, supervision by health care professionals, and government resources, the public mostly self-prescribes antibiotics resulting in bacterial resistance, superimposed bacterial infections, drug reactions, and high cost.

This is especially a major concern in pediatrics, as children use more antibiotics than other age groups.[15] Parental self-medication with antibiotics is directly linked with education and

awareness among parents. Viral infections in children like cold, flu, respiratory infections, and gastrointestinal infections are taken as bacterial infections and antibiotics are used unnecessarily for these infections resulting in adverse effects. Irrational use of antibiotics by parents is not only a single concern, but they also influence physicians' prescriptions for antibiotics even when they are not necessary. Many studies revealed that many doctors after noticing their patients had started taking antibiotics before the consultation had asked to complete an antibiotics course even when unnecessary.[16]

Practices of parental self-medication with antibiotics are more prevalent in middle-income countries and low-income countries. It was reported in various types of research that the prevalence of parental self-medication with antibiotics was 59.4% in China.[17] 42.05% in the Philippines.[18] and 43% in Uganda and Nigeria.[19] Major reasons that result in self-medication with antibiotics are lack of Knowledge, attitude, and practices (KAP) towards antibiotics use. Our study aims to examine the prevalence of parental self-medication with antibiotics among different socioeconomic groups and geographical areas of Pakistan. By law, no antibiotic should be purchased or used without a prescription in Pakistan. However, previous studies performed in Pakistan showed many antibiotics were used by self-prescription and a recent study showed that 32.5% of people self-medicated themselves with antibiotics.[20] However, no pinpoint information was available about PSMA in Pakistan. Thus, it is crucial to conduct a study regarding PSMA that may help concerned authorities in formulating strict policies to avoid serious consequences.

Consequently, this study aims to establish the prevalence of parental self-medication with antibiotics in different socioeconomic groups and geographical areas specifically Kashmir, Rahim Yar Khan, and Dera Ghazi khan. It is aimed to perceive common illnesses among children in these areas and the most commonly used antibiotics. This study also aims to establish an association of PSMA with parents' education, socioeconomic status, and knowledge about antibiotic resistance. Results from this study are expected to help in the planning of educational and regulatory interventions that encourage the appropriate use of antibiotics.

METHODOLOGY

A descriptive analytical cross-sectional study was performed in Pakistan in 2022. Objectives of the study were to describe the prevalence and determinants for parental self-medication of their children with antibiotics and to characterize their knowledge, attitude and practices regarding self-medication with antibiotics in this era. Target population was the parents of children between ages of 1 -14 years. This study completed in almost 4 months from august 2022 to November 2022. A questionnaire was formulated to collect data after critically reviewing previous literature.[21,22] Validity and clarity of questionnaire were assessed critically and feedback was collected to improve logicality, clarity and congruency of the questionnaire. It was formulated in English and then translated to Urdu for convenience of illiterate parents. To clear any ambiguity and acceptability of questionnaire, pilot study was performed among 20 respondents. First part of questionnaire consisted of demographic variables like Name, Age, Sex, Educational status, Estimated monthly income, Family size and region to which the subject belong while second part consisted of questions regarding knowledge, attitude and practice of self-medication with antibiotics. Almost 500 questionnaires were distributed to get sufficient sample size of 376 with 95% confidence interval and 5% precision. Data was collected from parents at Outdoor patient department, vaccination centers and randomly delivered to student's parents in different schools. Data collection was done by multi-cluster method and given area was classified into different geographical and socioeconomic clusters and questionnaires were distributed randomly. Our study received ethical approval from Institutional Review Board, Sheikh Zayed Medical College, Rahim Yar Khan (Ref. No. 536/IRB/SZM/SZH) in October 2022.

Statistical analysis was performed by applying the SPSS Software (version 26, SPSS Inc.) Descriptive analysis involving frequency and percentage of categorical values and mean standard deviations or medians for continuous variables was done. Chi-square test was done to assess the relationship between knowledge, attitude, practices and demographic values with self-medication. Significance value was set at $\alpha = 0.05$.

RESULTS

Table 1: Demographic and Socio-Economic Characteristics of Participants\

Characteristics	Categories	n (%)
Gender	Men	147 (39.1)
	Women	229 (60.9)
Residence	Rural	239(63.6)
	Urban	137(36.4)
Number of children	One	68(18.1)
	Two	84(22.3)
	Three	86(22.9)
	More than three	138(36.7)
Educational Status	Under Graduation	144(38.29)
	Graduation/Masters	232(61.7)

Table 2: Antibiotics Knowledge and Self-Medication with Antibiotics

Characteristics	Categories	n(%)
Knowledge about Antibiotics	Yes	308(81.9)
	No	68(18.1)
Those who had knowledge about Antibiotics (308):		
Antibiotics used during last year	Once	48(15.58)
	Often	232(75.32)
	Always	28(9.09)
Visited Physician in case of disease		226(73.37)
Self-medicated their Children		82(26.62)
Refilled last Prescription in recurrence	Yes	156(50.65)
	No	78(25.32)
	Maybe	74(24.02)

Table 3: Descriptive Analysis of Questionnaire

Questions	Categories	n(%)
Q1- Did you complete course of antibiotics?	Yes	140(45.45)
	No	98(31.81)
	Maybe	70(22.73
In Case of Self-medication:		
Q2- What was your source of information?	Internet	24(30)
	Friends	46(57.5)
	Other	10(12.5)
Q3- Were the results of Self-medication satisfying?	Never	5(6.25)
	Sometimes	37(46.25)
	Half the time	27(33.75)
	Always	11(13.75)

Table 4: Participant's Characteristics and Response Correlation

Grouping Variables	Questions		
	Visiting Physician	Self-medication	Refilled Prescription
Educational Status	0.013*	0.01*	0.22
Family Size	0.58	0.64	0.76

$p < 0.05$

Out of 500 distributed questionnaires, 376 completely filled questionnaires were selected with no response bias about demographic characterization of respondents. The Individuals demographic and socio-economic characteristics are summarized in table 1. The majority of respondents were mothers

(60.9% table 1.) with mean age of 36. The majority of parents were resident of rural area (63.6 % table 1.) and had more than three children (36.7% table 1.) Majority of respondents had done graduation or Masters (61.7% table 1.)

In this study, 308 (81.9%) of respondents had knowledge about antibiotics while 68 (18.1%) did not know what antibiotics are. Out of 308 respondents who had knowledge about antibiotics, 296 (79.8% of total respondents) had medicated their children with antibiotics last year as illustrated in table 2. As represented in table 2, responses showed that majority of parents (73.73%) visited physician for prescription when their children were sick. However, 156 (50.65%) of those who had visited a physician did not refer again in case of recurrence of disease and refilled the last prescription. 82 (21.8 %) of total respondents and 26.62% 0f those who had knowledge about antibiotics had self-medicated their children with antibiotics. 140 (45.45%) parents had completed course of antibiotics while 98 (31.81%) did not complete course and 70 (22.73%) were not sure whether they had completed antibiotics course or not. 232 (75.32%) parents did not have any side effect of antibiotics use while 76 (24.67%) parents had experienced side effect of antibiotics use.

According to the research findings, most prevalent diseases against which antibiotics were used were Sore throat (19.7%) followed by seasonal fever (16 %) and abdominal pain. Amoxicillin was the highest frequently used antibiotics (32%), Azithromycin (12.6%), Metronidazole (12%) and cephalexin (9.6%) were also consumed. Out of all participants only 57 (15.2%) have good knowledge about antibiotics resistance. As shown in table 4, the chi-square test showed a significant association between parent's education and physician visits. Similarly, a significant association was detected between parent's educational status and refilling of last prescription in case of recurrence. No significant relationship existed between other variables.

DISCUSSION

The study aimed to determine the prevalence of parents self-medicating their children with antibiotics and factors associated with this practice. Our results demonstrated that majority of the participants visited physician in case of disease and 21.8% of participants who self-medicated their children is an alarming rate and increasing progressively. Although, parental self-medication rate is higher in Pakistan in comparison to studies done in Iran where parental self-medication with antibiotics were 6.65%[23] but it is less than the studies done in Asmara, Eritrea where it was 45.1%.[21] According to literature, easy availability of antibiotics without prescription is an important factor for self-medication in many countries (24). Our study showed educated parents visited physicians more often, however, results of other studies show that educated parents used non-prescribed antibiotics more often than those with lower education. This higher self-medication rate in educated mothers may be due to better understanding of medical knowledge through media and internet.[25] Although educated parents become more conscious about the health of children but it does not prevent self-medication. As the literature indicates, higher educated parents tend to internet and other media sources for medical knowledge. Therefore, higher educated mothers as well as low educated ones, need public health awareness about undesirable and adverse effects of antibiotics use without prescription. So, health literacy and it's improvement in the community is the major factor to fight with alarmingly increase use of non-prescribed antibiotics.

Our study showed majority of participants were mothers and had graduation degree having general knowledge about antibiotics and their use in seasonal fever, sore throat and abdominal pain. Most commonly used antibiotic was amoxicillin and several other studies have reported the use of amoxicillin for self-medication .[26]Reason behind its access use might be explained by fact that it is well known antibiotic in communities than other antibiotics and its availability. Majority of participants had more than three children and burden of family size also plays an important role in refilling of last prescription in case of recurrence. Although our study did not show significant relationship between family size and self-prescription with antibiotics, it contraindicated other studies .[23,21] Studies from other countries also suggest that long wait time and high cost of clinic visits also paly important role in self-medication of children.[26] Our study showed that almost half the participants had completed full course of antibiotics and others had not completed or were not sure. Majority of participants had little knowledge about antibiotics resistance which is highly alarming and needs to be dealt with. Policy making authorities need to focus on health literacy of parents regarding use of antibiotics and its adverse effects in case of misuse of antibiotics. Awareness regarding antibiotics resistance and viral infections could be considerably useful in dealing with increasing prevalence of non-prescribed antibiotics use and avoiding its consequences.

Finally, before applying results of this study, it is emphasized to consider the following limitations:

Since the data was collected through self-administered questionnaires, so participant's misunderstanding might be relevant. Participant's medical insurance status was not identified in this study. Some participants did not have accurate knowledge of antibiotics. Responses from parents were subject to their ability to recall the use of antibiotics within a year. Despite the mentioned limitations, this study improve the existing literatures on the practice of parental self-medication with antibiotics and knowledge, attitude and practices toward antibiotics use, for the formulation of new policies and health education on antibiotics use in Pakistan.

CONCLUSION

The findings of this study showed that there is increasing prevalence of parental self-medication with antibiotics and high level of irrational use of antibiotics already prescribed in previous physician visits. The lack of parental knowledge about proper use of antibiotics and its adverse effects may be the major factor in self-medication practice. In Pakistan, as in many other countries, antibiotics are easily available and plays an important role in self-medication. Corrective measures such as enforcing already formulated laws and formulation of new laws to prevent misuse of antibiotics would protect the community from misusing antibiotics. Antibiotics stewardship programs should target both the doctors and parents by tailored health education and strengthening of doctor-patient relationship. National awareness campaigns to educate parents about proper use of antibiotics is a necessary step and should be considered seriously by health policy makers.

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